

611-TD-558-001

EOSDIS Core System Project

M&O Procedures: Section 12—Resource Planning

Interim Update

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Upper Marlboro, Maryland

Preface

This document is an interim update to the Mission Operations Procedures Manual for the ECS Project, document number 611-CD-500-001. This document has not been submitted to NASA for approval, and should be considered unofficial.

The document has been updated to include information relevant to ECS Release 5B.

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12. Resource Planning

12.1 Resource Planning Process

The Resource Planning process is the mechanism by which reservations for non-routine ground events are defined and controlled. Such events may include testing, corrective maintenance, preventive maintenance or system upgrades, or any other event that requires DAAC production processing resources. Resource planning defines ground events, which are also used in production planning; thus, resource planning can take place whenever a production plan needs to be created. In general, this will occur on a biweekly basis for 30-day plans, on a weekly basis for ten-day plans, and on a daily basis. However, ground events can be entered at any time. The important point is that it is necessary to be aware of the anticipated processing load and upcoming maintenance events for about the next month.

Resource Planning includes two general types of activities; i.e., Resource Definition and Resource Scheduling. The site M&O Resource Planner uses the Resource Editor GUI within the Planning Subsystem to define ECS resources used in production processing. The Resource Planner and Resource Manager use the Resource Scheduler GUI to schedule non-routine events against ECS resources.

Subsequent sections related to Resource Planning address the following topics:

- a. Section 12.2 An overview of the process for defining resources and step-by-step procedures for using the Resource Editor.
- b. Section 12.3 An overview of the process for scheduling resources and step-by-step procedures for using the Resource Scheduler.
- c. Section 12.4 An overview of the process for tuning system parameters related to Resource Planning and step-by-step procedures for changing configuration parameters.

12.2 Defining Resources

In the original design for resource definition the resource planning list in the PDPS database was to have been initialized with resource data from the Baseline Manager database, synchronizing the processing resource data in the two databases. Processing resources could be added to or deleted from the resource planning list in the PDPS database without affecting the Baseline Manager database. Consequently, the Resource Planner would be able to specify resources that were not currently usable but would become available in the future. Furthermore, the Resource Planner would be able to reset resource planning to the baseline at any time (as the baseline changed).

Given the fact that the quantity of processing resources is not very great and the resources can be defined to the PDPS database in a fairly short period of time, it is generally preferable to define resources individually.

The Resource Planner uses the Resource Editor GUI to define ECS resources used in production processing in the following terms:

- a. “Disks.”
- b. “Virtual computers” (sets of CPUs and associated memory and disks).
- c. “Strings” (sets of virtual computers).
- d. “Real computers” (hosts that are composed of one or more virtual computers).
- e. “AutoSys” (“strings” associated with the production processing software).
- f. Generic “hardware.”

The following general process is used for defining production resources:

- a. Determine what production resources are available.
- b. Determine the distribution of resources among operating modes.
- c. Define resources for each mode using the Resource Editor GUI.

Each procedure outlined has an **Activity Checklist** table that provides an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks could be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

Table 12.2-1, below, provides an Activity Checklist for Defining Resources.

Table 12.2-1. Defining Resources - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner	Launch the Resource Editor	(P) 12.2.1	
2	Resource Planner	Synchronize Resource Listings	(P) 12.2.2	
3	Resource Planner	Determine Actual Processing Resources	(P) 12.2.3	
4	Resource Planner	Add a Resource	(P) 12.2.4	
5	Resource Planner	Modify a Resource	(P) 12.2.5	
6	Resource Planner	Delete a Resource	(P) 12.2.6	
7	Resource Planner or DAAC Staff	Shut Down the Resource Editor	(P) 12.2.7	

12.2.1 Launch the Resource Editor

The Resource Editor is invoked from a UNIX command line prompt. Table 12.2-2 presents (in a condensed format) the steps required to launch the **Resource Editor** GUI. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the detailed procedures that follow.

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0pls03, g0pls01, l0pls02, n0pls02**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.
- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “utilities” is the directory containing the Planning Subsystem start-up scripts.
- 6 Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
 - a. Application home environment is entered.

- b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.

7 Start the Resource Planning background processes by entering:

EcPIRpAllStart <MODE> <application_id>

- a. The Resource Planning background processes are launched.
- b. The application_id or MSGSRV_ID is a number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same application_id consistently during a resource planning session.

8 Start the **Resource Editor** GUI by entering:

EcPIRpReStart <MODE> <application_id>

- a. The **Resource Editor** GUI is launched.
- b. The **Resource Editor** GUI displays a list of defined resources and a series of buttons that enable the following operations:
 - 1. **New...** Add a resource definition. (Section 12.2.4)
 - 2. **Modify...** Edit or review the details of an existing resource definition. (Section 12.2.5)
 - 3. **Delete** Delete a resource definition. (Section 12.2.6)
 - 4. **Fetch Baseline** Generates a report from the Baseline Manager to the Resource Planning workstation. The report is an ASCII listing of the production baseline. Used in synchronizing the baseline. (Section 12.2.2)
 - 5. **Load Baseline** Synchronizes the PDPS database with the baselined resource information. (Section 12.2.2)

Table 12.2-2. Launch the Resource Editor - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set the environment variables	enter text, press Enter
4	Enter EcPIRpAllStart <MODE> <application_id>	enter text, press Enter
5	Enter EcPIRpReStart <MODE> <application_id>	enter text, press Enter

12.2.2 Synchronize Resource Listings

NOTE: Before attempting to synchronize resource listings, ask the local Configuration Management Administrator whether the resources have been defined in the Baseline Manager database at your site. If the resources have **not** been defined in the Baseline Manager, they will have to be added to the Resource Planning list as described in the **Add a Resource** procedure, Section 12.2.4.

This function synchronizes the Resource tables with the Baseline Manager. Table 12.2-3 presents (in a condensed format) the steps required to synchronize resource listings. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedure:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the following steps.
- 2 From the **Resource Editor** GUI, **single-click** on the **Fetch Baseline** button.
 - a. The **Baseline Request** pop-up dialog box is displayed requesting entry of the desired baseline date.
- 3 In the **Enter Baseline Date** field enter the desired baseline date in the following format:
<DD MMM YYYY>
 - a. For example: 01 JUN 2000
- 4 **Single-click** on the **OK** button to apply the baseline date and dismiss the **Baseline Request** pop-up window.
 - a. This action generates a report from the Baseline Manager to the Resource Planning workstation. The report is an ASCII listing of the production baseline.
- 5 From the **Resource Editor** GUI, **single-click** on the **Load Baseline** button.
 - a. This action synchronizes the PDPS database with the baselined resource information.
- 6 To exit from the **Resource Editor** GUI execute the procedure in Section 12.2.7.

Table 12.2-3. Synchronize Resource Listings - Quick-Step Procedures (1 of 2)

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the Fetch Baseline button	single-click
3	Enter <DD MMM YYYY> (the date for the desired baseline)	enter text
4	Select OK	single-click

Table 12.2-3. Synchronize Resource Listings - Quick-Step Procedures (2 of 2)

Step	What to Enter or Select	Action to Take
5	Select the Load Baseline button	single-click
6	Exit from the Resource Editor GUI if desired	Use procedure in Section 12.2.7

12.2.3 Determine Actual Processing Resources

The Resource Editor allows the authorized operator to define resources in the following categories:

- a. **Disks:** Disk partitions that are associated with and provide temporary data storage for the input and output files used in processing.
- b. **Virtual Computers:** Virtual computers composed of CPUs, random-access memory (RAM), and associated-disk(s). The CPUs and RAM specified for a virtual computer are components of the real computer from which the virtual computer is derived.
- c. **Strings:** Sets of one or more virtual computers. Strings are associated with the processing software (AutoSys). A dual science processor configuration can be defined by specifying strings containing virtual computers derived from different real computers.
- d. **Real Computers:** Physical computing devices (hosts), each of which contains one or more CPUs. Each science processor host (“real” computer) is divided into one or more virtual computers by allocating CPUs and RAM from the real computer to the virtual computer(s).
- e. **AutoSys:** Identifies the string(s) of virtual computers used by the production processing software.
- f. **Hardware:** Any type of equipment that is not defined as a computer or disk may be defined as “hardware.”

The ECS Operational Readiness Plan for Release 2.0 (603-CD-003-001) specifies that initially disk partitions at the DAACs are to be split among the operating modes as follows:

- a. OPS – 60%.
- b. TS1 - 20%.
- c. TS2 - 20%.

However, it may be advantageous to reserve some nominal percentage of the disk (e.g., two to five percent) as a safety buffer. In any case, it is critical to ensure that the sum of the disk space assigned to the various modes is no more than the total disk space available.

Although the ECS Operational Readiness Plan does not specifically mention allocating resources other than disk partitions, CPUs and RAM need to be allocated among modes in the same manner. However, it is not necessary to be exact with the CPU count or RAM amount.

- a. There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- b. Actual CPU usage during processing is limited by the operating system (OS).
 1. If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
 2. What is really being defined is the maximum number of DPRs that will execute at a given time.
- c. It is important to monitor the load on each science processor.

1. CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
2. If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
3. If the science processor is at full capacity when OPS mode is at full processing capacity and it is suspected that the processor may be overworked, the number of CPUs allocated to OPS mode should be reduced.
- d. Random-access memory (RAM) is subject to the same considerations as CPUs.
 1. RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.
- e. The OS takes care of true CPU and RAM allocation.

Another consideration is the throttling of the processing load through the DpPrAutoSysMaxJobs variable. DpPrAutoSysMaxJobs is defined in the EcDpPrJobMgmt.CFG file in the /usr/ecs/MODE/CUSTOM/cfg directory on the Queuing Server (e.g., g0sps06).

- a. If DpPrAutoSysMaxJobs in OPS mode is set at 64 [allowing AutoSys to accommodate eight DPRs (consisting of eight jobs each) simultaneously in OPS mode] and ten CPUs are defined for OPS, it would not be possible to utilize all ten CPUs.
- b. If the value of DpPrAutosysMaxJobs were increased to 120 (15 DPRs times 8 jobs/DPR), there might be times when the processing of some DPRs was held up because only ten could be running the Execute job at a time.
- c. In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously.

Before data processing resources can be defined, it is necessary to know what resources are actually available at the DAAC. Some resources are defined in terms of other resources; for example, a string is defined as one or more virtual computers. However, it is generally necessary to have the following types of information available in order to define processing resources:

- a. Host names ["real computers"].
- b. Number of processors [CPUs] available on each host.
- c. Operating System (OS) for each host.
- d. Memory [RAM] on each host.
- e. Total disk space.
- f. AutoSys instance(s) at the DAAC.

Table 12.2-4 presents (in a condensed format) the steps required to determine the actual processing resources to be defined. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

NOTE: The procedure to determine the actual processing resources to be defined starts with the assumption that the DISPLAY environment variable has been set (Refer to Section 12.2.1).

- 1** In the terminal window, at the command line prompt, start the log-in to the applicable Science Processor by entering:

/tools/bin/ssh <hostname>

- a. Examples of hostnames include **e0spg01**, **g0spg01**, **l0spg01**, **n0spg03**.

- b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 2.
 - d. If you have not previously set up a secure shell passphrase, go to Step 3.
- 2 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 4.
- 3 At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 4 To access the mount point enter:
cd /usr/ecs/<MODE>/CUSTOM/pdps/<processor>/data/DpPrRm/<processor>_disk
 - a. Change directory to the disk mount point (e.g.,
 /usr/ecs/OPS/CUSTOM/pdps/g0spg01/data/DpPrRm/g0spg01_disk).
- 5 To determine disk size and usage enter:
df -k . (being sure to include the dot)
 - a. Information concerning disk size and use is displayed; for example:

Filesystem	Type	kbytes	use	avail	%use
Mounted on					
/dev/dsk/xlv/vg01	xfs	413394688	164646048	248748640	40
/vol1					
 - b. In the preceding example the total disk space is 413,394,688 kilobytes or 413,394.69 megabytes (413 gigabytes).
- 6 To obtain Information concerning the number of CPUs and amount of RAM (memory) enter:
hinv
 - a. The hinv command is available on Silicon Graphics, Inc. (SGI) hosts only.
 - b. Information concerning CPUs and RAM (memory) is displayed; for example (not all rows are shown):


```

Processor 0: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 1: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 2: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 3: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.6
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 4: 194 MHZ IP25
          
```

```

CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 5: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 6: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 7: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 8: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 9: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 10: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 11: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 12: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 13: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 14: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Processor 15: 194 MHZ IP25
CPU: MIPS R10000 Processor Chip Revision: 2.5
FPU: MIPS R10010 Floating Point Chip Revision: 0.0
Secondary unified instruction/data cache size: 1 Mbyte
Data cache size: 32 Kbytes
Instruction cache size: 32 Kbytes
Main memory size: 2048 Mbytes, 8-way interleaved
[...]
```

- c. In the example the science processor has 16 CPUs (Processor 0 – Processor 15) and 2048 megabytes of RAM.

7 Repeat Steps 1 through 6 for all other science processors (if any).

NOTE: Steps 8 through 14 describe the use of the Netscape browser to determine certain types of information concerning computer resources (including the number of CPUs and amount of RAM), which can be determined using the **hinv** command as described in Step 6. However, the “as-built” file accessed using the Netscape browser lists the necessary operating system information in addition to CPU and RAM data. The advantage of the **hinv** command is that it provides real-time data and is reliably up to date. The advantage of the “as-built” file accessed using the Netscape browser is that it provides operating system data that is not available using the **hinv** command.

- 8** To launch the Netscape web browser enter:
netscape &
- It may be necessary to change directories before launching the Netscape web browser (e.g., `cd /tools/bin/netscape3.01`).
 - The Netscape web browser is displayed.
- 9** In the browser's **Location (Go To)** field enter the following address:
`http://cmdm.east.hitc.com/baseline`
- The ECS Baseline Information System web page is displayed.
- 10** **Single-click** on the **ECS Configuration** link.
- A table of files is displayed.
- 11** **Single-click** on the **Asbuilts** link for the relevant DAAC.
- A list of files is displayed.
- 12** **Single-click** on the file name corresponding to the desired host (e.g., `x0spg01.asbuilt.html`).
- A report containing the following types of information (among other items) is displayed:
 - Host Name ["real computer"].
 - Processors [CPUs].
 - Operating System.
 - Memory [RAM].
 - Interrogation Date (useful in determining how up-to-date the information is).
- 13** **Single-click** on the browser **Back** button.
- The list of "as-built" files is displayed.
- 14** Repeat Steps 12 and 13 for all other science processors (if any).

- 15 Exit from the Netscape browser when the necessary information has been acquired by executing the following menu path:
File → Exit
a. The Netscape browser disappears.
- 16 In the terminal window, at the command line prompt, start the log-in to the Queuing Server host by entering:
/tools/bin/ssh <hostname>
a. Examples of hostnames include **e0sps04**, **g0sps06**, **l0sps03**, **n0sps08**.
b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 17.
d. If you have not previously set up a secure shell passphrase, go to Step 18.
- 17 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
a. Go to Step 19.
- 18 At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 19 To gain access to the directory containing the AutoSys configuration files enter:
cd /usr/ecs/<MODE>/COTS/<autotree>/autouser
a. Change directory to the directory (e.g.,
/usr/ecs/<MODE>/COTS/autotreeb/autouser,
/usr/ecs/<MODE>/COTS/autotree/autouser,
/data1/SHARED/COTS/autotree/autouser) containing the set-up files (e.g., **FMR.autosys.csh.g0sps06**) and the AutoSys configuration files (e.g., **config.FMR**).
b. The particular path to be typed may vary from site to site.
c. The AutoSys instance at the DAAC is identified by three capital letters appended to the beginning of the set-up files and the end of the configuration file.
1. Typically, AutoSys instances at the DAACs are identified as **FMR**.
d. It is possible to have multiple AutoSys instances installed at a DAAC.

Table 12.2-4. Determine Actual Processing Resources - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log-in to the applicable Science Processor	enter text, press Enter
2	Enter <code>cd /usr/ecs/<MODE>/CUSTOM/pdps/<processor>/data/DpPrRm/<processor>_disk</code>	enter text, press Enter
3	Enter <code>df -k .</code> (being sure to include the dot)	enter text, press Enter
4	Observe the disk capacity	read text
5	Enter <code>hinv</code>	enter text, press Enter
6	Observe the number of CPUs and total memory (RAM)	read text
7	Repeat Steps 1 through 6 for all other science processors (if any)	
8	Launch Netscape	enter text, press Enter
9	Enter <code>http://pete.hitc.com/baseline</code>	enter text, press Enter
10	Select ECS Configuration	single-click
11	Select (click on) the Asbuilts for the relevant DAAC	single-click
12	Select the file name corresponding to the desired host	single-click
13	Observe the number of CPUs, total memory (RAM), and Operating System identification	read text
14	Select the browser Back button	single-click
15	Repeat Steps 12 through 14 for all other science processors (if any)	
16	Execute File → Exit to exit from Netscape	single-click
17	Log-in to the Queuing Server host	enter text, press Enter
18	Enter <code>cd /usr/ecs/<MODE>/COTS/<autotree>/autouser</code>	enter text, press Enter
19	Observe the identification of the AutoSys instance	read text

12.2.4 Add a Resource

These procedures address adding such resources as computers, disk partitions, strings, and generic hardware resources to the resource planning list. The ECS Operational Readiness Plan for Release 2.0 (603-CD-003-001) specifies that initially disk partitions at the DAACs are to be split among the operating modes as follows:

- a. OPS – 60%.
- b. TS1 - 20%.
- c. TS-2 - 20%.

However, it may be advantageous to reserve some nominal percentage of the disk (e.g., two to five percent) as a safety buffer. In any case, it is critical to ensure that the sum of the disk space assigned to the various modes is no more than the total disk space available.

Table 12.2-5 presents (in a condensed format) the steps required to add a resource. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the following steps.
- 2 From the **Resource Editor** GUI, select the type of resource to be added from the list on the **Resource Type** button.
- 3 Either **single-click** on the **New...** button or execute the following menu path:
File → **New**
- 4 Define the resource as specified in the corresponding procedure section.
 - a. Refer to the specified section for defining the desired type(s) of resources:
 1. **Disk** – Section 12.2.4.1.
 2. **Virtual Computer** – Section 12.2.4.2.
 3. **Real Computer** – Section 12.2.4.3.
 4. **String** – Section 12.2.4.4.
 5. **Autosys** – Section 12.2.4.5.
 6. **Hardware** – Section 12.2.4.6.
 - b. Resources should generally be added in the preceding order (due to dependencies among resources).
- 5 After the data have been entered, **single-click** on one of the following buttons:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

Table 12.2-5. Add a Resource - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the type of resource from the Resource Type button	single-click
3	Select the New... button	single-click
4	Make entries in the necessary fields	Use procedures in Sections 12.2.4.1 through 12.2.4.6
5	Select Save	single-click

12.2.4.1 Disk Details GUI

- 1 Enter the relevant information in the following fields on the **Disk Details** GUI:
 - a. **Resource Name** User-defined name for the resource. (required)
 1. Example: g0spg01_disk_OPS.

- b. **Activity** System-generated default activity; can be changed by clicking on the bar in the **Activity** field and then clicking on one of the available options.
 - c. **Partition Size** The size of the disk partition, in **megabytes**. (required)
 - 1. Although the label on the GUI implies that partition size should be entered in “blocks,” the label is erroneous. Enter the partition size in megabytes.
 - d. **Block Size** Block size in bytes (always 1024) used for the disk. (required)
 - e. **Comments** User comments on the resource.
- 2 After the data have been entered, **single-click** on one of the following buttons:
- a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.4.2 Virtual Computer Details GUI

- 1 Enter the relevant information in the following fields on the **Virtual Computer Details** GUI:
- a. **Resource Name** User-defined name for the virtual computer. (required)
 - 1. Example: g0spg01_vc_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Number of CPUs** Number of CPUs within the virtual computer. (required)
 - d. **Total RAM** The total memory for the virtual computer in megabytes. (required)
 - e. **Operating System** The operating system name/version for the computer. (required)
 - f. **Disks** A list of the disks previously defined for that site. This list of disks from which to select is used when a disk is associated (or disassociated) with the computer. After items are highlighted, arrow buttons will move items from this list to **Associated Disks** or from the list of **Associated Disks** to the **Disk** list.
 - g. **Associated Disks** Disks in this list are associated with the computer.
 - h. **Comments** User comments on the resource.
- 2 After the data have been entered, **single-click** on one of the following buttons:
- a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.4.3 Real Computer Details GUI

- 1 Enter the relevant information in the following fields on the **Real Computer Details** GUI:
 - a. **Resource Name** User-defined name for the real resource. (required)
 1. Example: g0spg01.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Computers** A list of the virtual computers previously defined for that site. This list of virtual computers from which to select is used when a virtual computer is associated (or disassociated) with the real computer. After items are highlighted, arrow buttons will move items from this list to **Associated Computers** or from the list of **Associated Computers** to the **Computers** list.
 - d. **Associated Computers** Virtual computers in this list are associated with the real computer.
 - e. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.4.4 String Details GUI

- 1 Enter the relevant information in the following fields on the **String Details** GUI:
 - a. **Resource Name** User-defined name for the resource. (required)
 1. Example: g0spg01_string_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Computers** A list of virtual computers previously defined for that site. This list of computers from which to select is used when a computer is associated (or disassociated) with the string. After items are highlighted, arrow buttons will move items from this list to **Associated Computers** or from the list of **Associated Computers** to the **Computer** list.
 - d. **Associated Computers** Virtual computers in this list are associated with the string.
 - e. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.4.5 AutoSys Details GUI

- 1 Enter the relevant information in the following fields on the **Autosys Details** GUI:
 - a. **Resource Name** User-defined name for the AutoSys resource. (required)
 1. Example: FMR.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Strings** A list of the strings previously defined for that site. This list of strings from which to select is used when a string is associated (or disassociated) with the AutoSys resource. After items are highlighted, arrow buttons will move items from this list to **Associated Strings** or from the list of **Associated Strings** to the **Strings** list.
 - d. **Associated Strings** Strings in this list are associated with the AutoSys resource.
 - e. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.4.6 Hardware Resource Details GUI

- 1 Enter the relevant information in the following fields on the **Hardware Resource Details** GUI:
 - a. **Resource Name** User-defined name for the resource. (required)
 1. Example: g0spg01_cdrom_OPS.
 - b. **Activity** System-generated default activity; can be changed by clicking on the bar in the Activity field and then clicking on one of the available options.
 - c. **Comments** User comments on the resource.
- 2 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

12.2.5 Modify a Resource

Table 12.2-6 presents (in a condensed format) the steps required to modify a resource. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the steps that follow.
- 2 From the list of resources displayed on the **Resource Editor** GUI, **single-click** on the resource to be modified.
- 3 **Single-click** on the **Modify...** button to access the appropriate Details GUI.

- 4 Make the modifications.
 - a. For field descriptions, refer to Sections 12.2.4.1 through 12.2.4.6.
- 5 After data have been entered, **single-click** on the appropriate button from the following selections:
 - a. **Save** to save **and** exit.
 - b. **Cancel** to exit **without** saving.

Table 12.2-6. Modify a Resource - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the resource to be modified	single-click
3	Select the Modify... button	single-click
4	Make the modifications	Use procedures in Sections 12.2.4.1 through 12.2.4.6
5	Select Save	single-click

12.2.6 Delete a Resource

Table 12.2-7 presents (in a condensed format) the steps required to delete a resource. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Editor** GUI by executing Steps 1-8 of Section 12.2.1 (if the **Resource Editor** GUI is not currently running) then continue with the following steps.
- 2 From the list of resources displayed on the **Resource Editor** GUI, **single-click** on the resource to be deleted.
- 3 **Single-click** on the **Delete** button.
 - a. A dialogue box pops up to verify whether the resource is really to be deleted.
- 4 **Single-click** on one of the following buttons as appropriate:
 - a. **OK** to remove the resource from the list and from the PDPS database **and** exit.
 - b. **Cancel** to exit **without** deleting the resource.

Table 12.2-7. Delete a Resource - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Editor GUI	Use procedure in Section 12.2.1
2	Select the resource to be deleted	single-click
3	Select the Delete button	single-click
4	Select OK	single-click

12.2.7 Shut Down Resource Definition Applications

When resource definition activities have been completed, the Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the resource planning applications. If any of the three processes remains active, it is likely to interfere with subsequent attempts to launch resource planning applications.

Shutting down resource definition applications starts with the assumption that the **Resource Editor** GUI is currently being displayed.

Table 12.2-8 presents (in a condensed format) the steps required to shut down resource definition applications. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 To exit from the **Resource Editor** GUI when resource planning activities have been completed execute the following menu path:
File → Exit
 - a. The **Resource Editor** GUI disappears.
- 2 After quitting the **Resource Editor** GUI **single-click** in the UNIX window used to start the resource definition applications.
- 3 Shut down the Message Handler, System Name Server, and Resource Model by entering:
EcPIRpSlayAll <MODE> <application_id>
 - a. The **Message Handler** GUI disappears.
- 4 To obtain a list of active processes in the specified mode enter:
ps -ef | grep <MODE>
 - a. A list of active processes in the specified mode is displayed.
 - b. If an error message is received when **ps -ef | grep <MODE>** is entered, enter:
ps -auxwww | grep <MODE>
- 5 Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.
 - a. None of the following processes should be active:
 1. EcPIRpRe
 2. EcPIRpSi
 3. EcPIRpTl
 4. EcPlMsh
 5. EcPlSns
 6. EcPIRpRm

- 6 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, terminate the active process(es) by entering:
kill -15 process_id1 [process_id2] [process_id3] [...]
- 7 Repeat Steps 4 through 6 as necessary.

Table 12.2-8. Shut Down Resource Definition Applications - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Execute File → Exit to quit the Resource Editor GUI	single-click
2	Select OK	single-click
3	Select the UNIX window	single-click
4	Enter EcPIRpSlayAll <MODE> <application_id>	enter text, press Enter
5	Enter ps -ef grep <MODE>	enter text, press Enter
6	Verify that the resource planning processes have actually been shut down	observe
7	Enter kill -15 process_id1 [process_id2] [process_id3] [...] to terminate active process(es)	enter text, press Enter

12.3 Scheduling Resources

The Resource Planner and Resource Manager are both involved in resource scheduling using the Resource Scheduler. The Production Planner and Production Monitor are involved in the implementation of ground events.

- a. Resource Planner processes resource reservation requests for ground events.
- b. Resource Manager commits resource reservations.
- c. Production Planner sends committed resource reservations (ground events) to Data Processing via the Planning Workbench.
- d. Production Monitor monitors execution of ground events in processing.

The following process is used for generating and implementing resource reservations (ground events):

- a. Personnel who have a need for Planning Subsystem or Data Processing Subsystem resources submit requests for time on specified resources to accomplish the non-routine activities that they plan to undertake.
 1. Depending on DAAC policy, many personnel may have access to the resource planning applications for creating resource reservation requests.
 2. Alternatively, personnel may have to contact the Resource Planner to have resource reservation requests entered for them.
- b. The Resource Planner reviews requests for resource reservations to determine if the requests are valid.

1. Request information includes a description of the activity, the resources required, the time period(s) for using the requested resource(s), comments explaining the variance from normal use.
2. Resource Planner may decide to forward the request to a “sponsor” for validation.
3. A sponsor is someone who evaluates a resource reservation request based on expertise that is particularly relevant to the resource reservation request.
- c. If the Resource Planner or sponsor determines that the request to reserve the resource is valid, the Resource Planner “approves” it along with all other requests that have been validated.
 1. The set of all validated resource reservation requests is considered a draft Resource Plan.
- d. The scheduling software identifies conflicts (if any) in the draft Resource Plan and alerts the Resource Planner to the problem(s).
- e. If possible, the Resource Planner resolves all conflicts before presenting the proposed plan to the Resource Manager to have the resources committed.
 1. However, during the conflict-resolution process the Resource Planner may have to consult with resource requesters and the Resource Manager to ensure that the reserved resources will not have adverse effects on the DAAC’s high-priority events.
- f. When the Resource Planner has achieved a conflict-free plan, it is presented to the Resource Manager to be implemented.
- g. The Resource Manager “commits” the resource plan, which signals the Planning Subsystem that the plan can be implemented.
 1. Committing a plan actually involves committing all of the individual approved resource reservation requests that collectively make up the plan.
- h. All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing.
- i. In Data Processing a ground event job for each resource reservation is sent to the specified resource(s) at the indicated start time.
 1. If a data processing job is already using the specified resource(s) at the ground event’s scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job.

Each procedure outlined has an **Activity Checklist** table that provides an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks could be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

Table 12.3-1, below, provides an Activity Checklist of Resource Scheduling activities.

Table 12.3-1. Resource Scheduling - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner or DAAC Staff	Launch the Resource Scheduler	(P) 12.3.1	
2	Resource Planner or DAAC Staff	Create a Resource Reservation Request	(P) 12.3.2	
3	Resource Planner or DAAC Staff	Edit a Resource Reservation Request	(P) 12.3.3	
4	Resource Planner or Sponsor	Validate or Reject a Resource Reservation Request	(P) 12.3.4	
5	Resource Planner	Approve a Resource Reservation Request	(P) 12.3.5	
6	Resource Manager/Resource Planner	Commit Resource Reservation Requests	(P) 12.3.6	
7	Resource Planner	Review the Resource Timeline	(P) 12.3.7	
8	Resource Planner	Delete a Resource Reservation Request	(P) 12.3.8	
9	Resource Planner or DAAC Staff	Shut Down Resource Planning Applications	(P) 12.2.7	

12.3.1 Launch the Resource Scheduler

The **Resource Scheduler** is invoked from a UNIX command line prompt. Table 12.3-2 presents (in a condensed format) the steps required to launch the **Resource Scheduler**. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation by entering:
/tools/bin/ssh <hostname>
 - a. Examples of hostnames include **e0pls03**, **g0pls01**, **l0pls02**, **n0pls02**.
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).

- c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.
- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/utilities
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. "utilities" is the directory containing the Planning Subsystem start-up scripts.
- 6 Set the application environment variables by entering:
setenv ECS_HOME /usr/ecs/
 - a. Application home environment is entered.
 - b. When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to set it manually.
- 7 Start the Resource Planning background processes by entering:
EcPIRpAllStart <MODE> <application_id>
 - a. The Resource Planning background processes are launched.
 - b. The **application_id** or **MSGSRV_ID** is a number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same **application_id** consistently during a resource planning session.
- 8 Start the **Resource Scheduler** GUI by entering:
EcPIRpSiStart <MODE> <application_id>
 - a. The Resource Scheduler is launched.
 - b. The **Resource Scheduler** Graphical User Interface (GUI) is accessed. The GUI displays the Resource Reservation List, activity type, and a series of buttons that enable the following operations:
 1. **New...** Create a resource reservation request. (Section 12.3.2)
 2. **Modify...** Edit or review the details of an existing resource reservation request. (Section 12.3.3)
 3. **Approve** Used to indicate that the resource reservation request(s) has (have) been validated and a draft resource plan can be created. Clicking on this button causes the Planning Subsystem to determine whether there are conflicts between

this resource reservation and other reservations. The Planning Subsystem detects conflicts and reports them to the operator. (Section 12.3.5)

4. **Commit globally** Commit all “approved” resource reservations; at this point the ground events will be accessible by the production planning software. (Section 12.3.6)
5. **Time Line** Display a timeline-oriented view of the resource plan. (Section 12.3.7)
6. **Report** The **Report** option is disabled. The reports have been deleted from the system requirements.

Table 12.3-2. Launch the Resource Scheduler - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/utilities	enter text, press Enter
3	Set the environment variables if necessary	enter text, press Enter
4	Enter EcPIRpAllStart <MODE> <application_id>	enter text, press Enter
5	Enter EcPIRpSiStart <MODE> <application_id>	enter text, press Enter

12.3.2 Create a Resource Reservation Request

Table 12.3-3 presents (in a condensed format) the steps required to create a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use this quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures.

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1 (if the GUI is not currently running) then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the **New...** button to access the **Resource Reservation Request Edit/Definition** GUI.
- 3 Enter resource request identification information into the displayed fields. Press [TAB] to move from field to field. **NOTE:** Data that is system-generated is identified.
 - a. **Request Name** User-provided name for the resource request. (required)
 - b. **Edited Date** System-generated date of request entry.
 - c. **Originator** User-provided name of the authorized user preparing the resource request.
 - d. **Sponsor** User-provided name of the individual who is to review and validate the Resource Request; the subject-matter-expert. (required)
- 4 Enter resource scheduling information into the displayed fields. Press [TAB] to move from field to field.
 - a. **Activity Type** User-provided description of the type of activity; selected by the user from a selection list of valid options. (required)

- b. **Priority** User-provided priority for the activity. Use the slider to select the appropriate priority on a scale from 0 to 100. 1 denotes the highest priority and 100 designates the lowest.
 - c. **Description** User-provided description of the activity for which the resource is required. (required)
 - d. **Resource...** See Section 12.3.2.1, below. (required)
 - e. **Interval...** Not applicable to new resource reservation requests; may be applicable when editing a resource reservation request. See Section 12.3.3.1, below.
- 5** Enter duration information into the displayed fields to define the period over which the resource is required. Press [TAB] to move from field to field.
- a. **Start Date** User-provided start date of the resource request period. Enter in **MM/DD/YYYY** format. (required)
 - b. **Start Time** User-provided start time of the resource request. Enter in **hh:mm:ss** format. (required)
 - 1. **Start Time** must be later than the time when the resource reservation request will be saved; otherwise, it will not be possible to save the request.
 - c. **Stop Date** User-provided stop date of the resource request period. Enter in **MM/DD/YYYY** format. If a reservation is to be repeated over some **frequency** (see below), the stop date specifies the end date in the date range of the reservation request. (required)
 - d. **Stop Time** User-provided stop time of the resource request. Enter in **hh:mm:ss** format. (required)
 - e. **Frequency** See Section 12.3.2.2, below.
- 6** Enter comments concerning the resource reservation request in the **Comment** field.
- 7** After data have been entered, **single-click** on the appropriate button from the following selections:
- a. **Save** to save data.
 - 1. The resource reservation must be “saved” prior to validating or rejecting. After the request has been saved, it can then be **validated** or **rejected**.
 - 2. The selections **Validated** and **Rejected** are further discussed in Section 12.3.3.
 - b. **Clear** to clear entries. Once cleared, the entries are deleted from the system.
 - c. **Cancel** to exit screen without saving the request.

Table 12.3-3. Create a Resource Reservation - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the New... button	single-click
3	Enter resource identification information	enter text, press tab
4	Enter resource scheduling information	enter text, press tab
5	Enter duration information	enter text, press tab
6	Enter comments	enter text, press tab
7	Select Save	single-click

12.3.2.1 Selecting Resources...

Clicking on the **Resource...** button accesses a **Resources Selection** screen. The **Request Name** is blank and is to remain empty when creating a new resource reservation request. This screen provides a pair of lists: **Resources** and **Selected Resources**. The **Resources** list itemizes available resources. The **Selected Resources** list itemizes those resources that have been selected for incorporation into the resource reservation. The user selects the desired resource(s) and, using the arrow buttons, moves the resource(s) from one list to the other list.

- 1 **Single-click** on your selections in the list and **single-click** on the desired arrow to move resources between the **Resources** and **Selected Resources** lists.
- 2 **Single-click** on one of the following buttons as appropriate:
 - a. **OK** to save the selections and exit the screen.
 - b. **Cancel** to exit the screen **without** saving changes.

12.3.2.2 Selecting Frequency

The **Frequency** option button provides the mechanism that allows the user to specify whether the resource reservation request describes a one-time event or a recurring event. Clicking on **Frequency** allows the user to specify options for periodic resource requests; that is, to specify the frequency of occurrence of a repeating resource need. Several options for expressing the frequency are available in the **Frequency** selection list box combined with a text field that provides a qualifier (i.e., number of days) for the **Every_?_days** selection only. The frequency specified defaults to **Once** to indicate that the resource need covers the entire time period covered by 'Start Time' and 'Stop Time.' Other options are identified in Table 12.3-4. The dates generated are inserted in the **Selected Intervals** list box, described in Section 12.3.2.3, below.

Table 12.3-4. Frequency Qualifiers

Frequency	Text Qualifier:	Result:
Once	--	The default. Resource reservation covering the period from the start time and stop time for the start date specified.
Daily	--	Resource reservation for every day, between the start date and end date, for the start time and end time specified.
Weekly	--	Resource reservation for every week occurring on the day specified by the start date, repeated until the end date as specified.
Every_2_weeks	--	Resource reservation occurring biweekly on the day specified by the start date, repeated until the end date as specified.
Monthly	--	Resource reservation for every month on the start day of the month, repeated until the end date as specified.
Mon_thru_Fri	--	Resource reservation for every Monday through Friday, between the start date and end date, for the start time and end time specified.

Mon_Wed_Fri	--	Resource reservation for every Monday, Wednesday, and Friday, between the start date and end date, for the start time and end time specified.
Tues_Thurs	--	Resource reservation for every Tuesday and Thursday, between the start date and end date, for the start time and end time specified.
Every_?_days	<i>n</i>	Resource reservation for every <i>n</i> days, between the start date and end date, for the start time and end time specified.
Weekend	--	Resource reservation for every Saturday and Sunday, between the start date and end date, for the start time and end time specified.

12.3.3 Edit a Resource Reservation Request

Table 12.3-5 presents (in a condensed format) the steps required to edit a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, if not currently running, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the resource reservation request to be modified.
- 3 **Single-click** on the **Modify...** button to access the **Resource Reservation Request Edit/Definition** GUI.
- 4 Make the modifications to affected fields. (See Section 12.3.2, above.)
 - a. **Interval...** is applicable when editing a resource reservation request if certain intervals are to be excluded from the resource reservation. See Section 12.3.3.1, below.
- 5 If appropriate at this time, **single-click** on either **Validated** or **Rejected**.
 - a. **Validated** indicates that the reservation request is complete and ‘makes sense’; that is, the request includes the appropriate resources consistent with the type of activity that is being proposed.
 - b. **Rejected** indicates that the reservation request is rejected.
 - c. At this time, the **Comment** field may also be updated.
 - d. The **Status** field contains the status of the reservation request.
 1. Status is system-generated based on user-input in other fields.
- 6 After data is entered, **single-click** on the appropriate button(s):
 - a. **Save** to save data and exit screen.
 - b. **Clear** to clear entries. Once cleared, the entries are deleted from the system.
 - c. **Cancel** to exit screen.

Table 12.3-5. Edit a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be modified	single-click
3	Select the Modify... button	single-click
4	Make modifications to affected fields	Use procedure in Section 12.3.2
5	Select either the Validated button or the Rejected button, if applicable	single-click
6	Select Save	single-click

12.3.3.1 Deselecting Intervals...

The **Interval...** button provides the mechanism to tailor a **Frequency-based** request by overriding selected intervals (**Note:** the initial resource reservation must be saved prior to tailoring frequency-based requests.). Selecting the **Interval...** button, displays a secondary screen that provides a pair of lists: **Unselected Intervals** and **Selected Intervals**. **Unselected Intervals** lists the dates that will not be reserved for the reservation request. **Selected Intervals** lists the dates that will be included for the request. The Selected Interval dates are automatically generated by the system, based upon the **Frequency** option selected (see Section 12.3.2.2, above). You can move them to or from the **Unselected Intervals** list to modify the automated list. Dates are moved from one list to the other by selecting the dates and using the arrow keys. The **Request Name** is also displayed.

- 1 **Single-click** on your selections and **single-click** on the desired arrow to move dates between the **Selected Intervals** and **Unselected Intervals** lists.
- 2 **Single-click** on one of the following buttons as appropriate:
 - a. **OK** to save the selections and exit the screen.
 - b. **Cancel** to exit the screen **without** saving changes.

12.3.4 Validate or Reject a Resource Reservation Request

All resource reservation requests must be validated and approved before scheduling. Validation is the process whereby a request is checked for completeness, and its purpose is deemed reasonable. After reviewing a resource reservation request, the Resource Planner may choose to consult with appropriate DAAC staff or assign a staff member (“sponsor”) to validate a request. When the request is rejected, the status of the request is changed to "rejected" on the screen.

Table 12.3-6 presents (in a condensed format) the steps required to validate or reject a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, if not currently running, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the resource reservation request to be modified.
- 3 **Single-click** on the **Modify...** button to access the **Resource Reservation Request Edit** GUI.
- 4 **Single-click** on either **Validated** or **Rejected**.
 - a. **Validated** indicates that the reservation request is complete and ‘makes sense’; that is, the request includes the appropriate resources consistent with the type of activity that is being proposed.
 - b. **Rejected** indicates that the reservation request is rejected.
 - c. At this time, the **Comment** field may also be updated.
 - d. The **Status** field contains the status of the reservation request.
 1. Status is system-generated based on user-input in other fields.
- 5 After data is entered, **single-click** on the appropriate button(s):
 - a. **Save** to save data.
 - b. **Clear** to clear entries. Once cleared, the entries are deleted from the system.
 - c. **Cancel** to exit screen.

Table 12.3-6. Validate or Reject a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be modified	single-click
3	Select the Modify... button	single-click
4	Select either the Validated button or the Rejected button, as appropriate	single-click
5	Select Save	single-click

12.3.5 Approve a Resource Reservation Request

The **Approve** button is used when all reviews that are a part of the resource planning process have taken place and there are no objections to the resource usage as described by the request. Clicking on this button will verify that there are no conflicts between this resource reservation and other reservations. If conflicts are detected, a screen will pop up listing the conflicts to be addressed for resolution. Click **OK** to collapse the pop-up screen. Clicking on **Approve** generates the pop-up screen again (if conflicts exist). Approval occurs after a request has been validated and the event time is acceptable.

Table 12.3-7 presents (in a condensed format) the steps required to approve a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the

quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI, **single-click** on the resource reservation request to be approved.
- 3 **Single-click** on the **Approve** button.
 - a. If there are resource conflicts resulting from the attempt to approve the resource reservation request, a pop-up dialogue box appears indicating that the approval failed and making reference to the **Message Handler** GUI for further information.
- 4 **Single-click** on the **OK** button to collapse the pop-up dialogue box.
 - a. If there are no resource conflicts to be resolved, the entry in the Status column of the **Resource Scheduler** GUI indicates that the request is "Approved" (changes from "Validated"). [End of procedure.]
 - b. If there are resource conflicts to be resolved, the entry in the Status column of the **Resource Scheduler** GUI indicates that the request has "Conflicts" (changes from "Validated"). [Continue with Step 5.]
- 5 If there are resource conflicts to be resolved, examine the information displayed on the **Resource Scheduler** GUI.
 - a. Although the pop-up dialogue box makes reference to the **Message Handler** GUI for further information, no relevant data seems to be displayed there. Therefore, it is more appropriate to check for conflicts in the duration and frequency information for the resource reservation requests displayed on the **Resource Scheduler** GUI. When more than one resource reservation request is scheduled for the same date and time, there may be a conflict (if the same resource is specified in the requests).
 - b. It may be necessary to examine individual resource reservation requests in detail. If so, use the procedure to **Edit a Resource Reservation Request** (Section 12.3.3).
- 6 If necessary, consult with the resource requester(s), Resource Manager and other personnel to determine which resource reservation request(s) to modify or delete in order to create a conflict-free resource plan.
- 7 If applicable, go to the procedure to **Delete a Resource Reservation Request** (Section 12.3.8) and delete resource reservation request(s) as necessary to resolve the conflicts.
- 8 If applicable, go to the procedure to **Edit a Resource Reservation Request** (Section 12.3.3) and modify/validate resource reservation request(s) as necessary to resolve the conflicts.
- 9 If applicable, return to Step 2 to approve a modified resource reservation request.
 - a. The modified procedure must have been "validated." If necessary, refer to the procedure to **Validate or Reject a Resource Reservation Request** (Section 12.3.4).

Table 12.3-7. Approve a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be approved	single-click
3	Select the Approve button	single-click
4	Select the OK button	single-click
5	If there are resource conflicts to be resolved, examine the information displayed on the Resource Scheduler GUI	observe
6	Resolve conflicts as necessary	Use procedures in Sections 12.3.8, 12.3.3, and/or 12.3.4

12.3.6 Commit Resource Reservation Requests

Clicking on the **Commit globally** button commits all approved reservation requests and makes them accessible to Production Planning. All committed resource reservations are automatically included in the next production plan to be activated through the Planning Workbench and are subsequently sent to Data Processing.

In Data Processing a “ground event” job for each resource reservation is sent to the specified resource(s) at the indicated start time. If a data processing job is already using the specified resource(s) at the ground event’s scheduled start time, the data processing job runs to completion before releasing the resource(s) to the ground event job.

Table 12.3-8 presents (in a condensed format) the steps required to commit a Resource Reservation Request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 From the **Resource Scheduler** GUI, **single-click** on the **Commit globally** button.
 - a. Status shows **Committed** for all previously **Approved** requests.
- 2 To view a graphical representation of the resource plan execute the procedure in Section 12.3.7.
- 3 To exit from the **Resource Scheduler** GUI execute the procedure in Section 12.3.9.

Table 12.3-8. Commit Resource Reservation Requests - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Select the Commit globally button	single-click
2	View a graphical representation of the resource plan if desired	Use the procedure in Section 12.3.7
3	Exit from the Resource Scheduler GUI if desired	Use the procedure in Section 12.3.9

12.3.7 Review the Resource Timeline

The Resource Planning utilities allow the user to view the Resource Plan as a timeline. Table 12.3-9 presents (in a condensed format) the steps required to review the Resource Timeline. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, then continue with the following steps.
- 2 From the **Resource Scheduler** GUI **single-click** on the **Timeline** button.
 - a. The **Resource Timeline** GUI is displayed.
 - b. The display represents a set of resources, arranged along the left side of the screen and some period of time as indicated across the top edge of the screen.
 - c. The use of a resource over a period of time is represented by one or more 'resource reservation' bars across the screen.
 - d. A bar represents a time period during which a resource reservation has been planned for the resource.
 1. Each bar has the name of the resource reservation and a brief description.
 2. For time periods during which a reservation has not been placed against a resource, that resource is planned for use by a default activity, e.g., science processing computers will be used for science processing unless a reservation has been placed against that resource .
 3. Scroll bars allow scrolling up and down through the full list of resources and left and right in time.
- 3 Adjust the **Resource Timeline** window size and the view of the timeline as necessary using the mouse.
 - a. Grab a corner of the timeline window with the cursor and resize the window as desired.
 - b. Scroll up or down through the full list of resources.
 - c. Scroll left or right to go backward or forward in time.
- 4 If a different time scale (start and end dates and times) is desired, perform Steps 5 through 7; otherwise, go to Step 8.
- 5 Execute the following menu path:
Display → Change Time Scale

- a. The **plan window edit** window is displayed.
- 6 In the **Plan Win Start** and **Plan Win End** fields of the **plan window edit** window enter the date and time for the desired start and end times using the following format:
<DD MMM YYYY hh:mm:ss>
- 7 When the appropriate date and time have been entered, **single-click** on the appropriate button from the following selections:
- a. **OK** - to accept the changes and dismiss the **plan window edit** window.
 - b. **Apply** - to accept the changes without dismissing the **plan window edit** window.
 - c. **Cancel** - to cancel the changes and dismiss the **plan window edit** window.
- 8 If a different time span is desired, **single-click** and **hold** on the **Show** option button and select (highlight then release the mouse button) the desired time span from the option menu that is displayed:
- a. 1 hr
 - b. 4 hr
 - c. 8 hr
 - d. 12 hr
 - e. 24 hr
 - f. 48 hr
 - g. 4 day
 - h. 1 week
 - i. 2 week
 - j. 1 month
 - k. full scale
- 9 If no resources are displayed on the GUI or if different resources should be displayed, perform Steps 10 through 14; otherwise, go to Step 15.
- 10 Execute the following menu path:
Display → Change resources
- a. The **Resource edit** window is displayed.
- 11 If adding resource(s) from the **Available Resources** list to the **Viewed Resources** list, select (highlight) the resource(s) to be added, then click on the **Add** button to move the resource(s) to the **Viewed Resources** list.
- a. Highlighted resource(s) appear(s) on the **Viewed Resources** list.
- 12 If deleting resource(s) from the **Viewed Resources** list, select (highlight) the resource(s) to be removed, then click on the **Del** button to remove the resource(s) from the **Viewed Resources** list.
- a. Highlighted resource(s) disappear(s) from the **Viewed Resources** list.
- 13 If changing the order in which resources are listed in the **Viewed Resources** list, select (highlight) the resource to be moved, then **single-click** on the up or down arrow as necessary to reposition the selected resource.
- a. Highlighted resource changes position in the **Viewed Resources** list.

- 14 When the **Viewed Resources** list contains the desired set of resources, **single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **Resource edit** window.
 - b. **Apply** - to accept the changes without dismissing the **Resource edit** window.
 - c. **Cancel** - to cancel the changes and dismiss the **Resource edit** window.
- 15 If different color coding of the timeline is desired, perform Steps 16 through 20; otherwise, go to Step 21.
- 16 Execute the following menu path:
Display → Change colors
 - a. The **Color Selections** window is displayed.
- 17 **Single-click** on the name of one of the resource reservations to be recolored.
 - a. The resource reservation is highlighted.
- 18 **Single-click** on the desired color (in the color palette) to be applied to the highlighted resource reservation.
- 19 Repeat Steps 17 and 18 as necessary.
- 20 When the appropriate color changes have been made, **single-click** on the appropriate button from the following selections:
 - a. **OK** - to accept the changes and dismiss the **Color Selections** window.
 - b. **Apply** - to accept the changes without dismissing the **Color Selections** window.
 - c. **Cancel** - to cancel the changes and dismiss the **Color Selections** window.
- 21 Observe the resource reservation information displayed on the **Resource Timeline** GUI.
- 22 Repeat the previous steps as necessary.
- 23 If it becomes necessary to exit from the timeline GUI execute the following menu path:
File → Quit

Table 12.3-9. Review the Resource Timeline - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the Timeline button	single-click
3	Execute Display → Change Time Scale window	single-click
4	Enter plan window start date and time	enter text
5	Enter plan window end date and time	enter text
6	Select Ok	single-click
7	Select time span	single-click

8	Execute Display → Change Resources	single-click
9	Select resources to be viewed	single-click resources
10	Select Add	single-click
11	Select viewed resource to be reordered	single-click resource
12	Reorder viewed resources using up/down arrows	single-click
13	Select Ok	single-click
14	Execute Display → Change Colors	single-click
15	Select resource reservation	single-click
16	Select new color for resource reservation	single-click
17	Select Ok	single-click
18	Observe the resource reservation information	observe
19	Execute File → Quit to quit the timeline	single-click

12.3.8 Delete a Resource Reservation Request

Table 12.3-10 presents (in a condensed format) the steps required to delete a resource reservation request. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1** Launch the **Resource Scheduler** GUI by executing Steps 1-8 of Section 12.3.1, then continue with the following steps.
- 2** From the **Resource Scheduler** GUI, highlight (click on) the resource reservation request you want to delete.
- 3** Execute the following menu path:
File → Delete
 - a. Status shows "Deleted" for the selected request. The resource reservation request is not removed from the database at this point and is available for future reporting but will have no impact on resource planning. Resource reservations are removed from the Resource reservations (PDPS) database through routine database maintenance activities.
- 4** To exit from the **Resource Scheduler** GUI execute the procedure in Section 12.3.9.

Table 12.3-10. Delete a Resource Reservation Request - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Launch the Resource Scheduler GUI	Use procedure in Section 12.3.1
2	Select the resource reservation request to be deleted	single-click
3	Execute File → Delete	single-click

4	Exit from the Resource Scheduler GUI if desired	Use procedure in Section 12.3.9
---	--	---------------------------------

12.3.9 Shut Down the Resource Scheduler

When resource scheduling activities have been completed, the Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the resource planning applications. If any of the three processes remains active, it is likely to interfere with subsequent attempts to launch resource planning applications.

Shutting down the Resource Scheduler starts with the assumption that the **Resource Scheduler** GUI has been launched and is currently being displayed.

Table 12.3-11 presents (in a condensed format) the steps required to shut down resource scheduling applications. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the following detailed procedures:

- 1 To exit from the **Resource Scheduler** GUI when resource planning activities have been completed execute the following menu path:
File → Exit
 - a. The **Resource Scheduler** GUI disappears unless there are resource reservation requests with a status of “approved”.
 - b. If there are any resource reservation requests with a status of “approved” listed on the **Resource Scheduler** GUI, a **Close Application** pop-up dialogue box is displayed with a message “Status of the listed reservations” and a list of the resource reservation requests with “approved” status.
- 2 If the **Close Application** pop-up dialogue box is displayed, **single-click** on the appropriate button from the following selections:
 - a. **Ok** - to quit the **Resource Scheduler** GUI and dismiss the dialogue box.
 1. Selecting **Ok** effectively commits all “approved” Resource Reservations.
 - b. **Cancel** - to dismiss the dialogue box and return to the **Resource Scheduler** GUI.
- 3 After quitting the **Resource Scheduler** GUI **single-click** in the UNIX window used to start the resource scheduling applications.
- 4 Shut down the Message Handler, System Name Server, and Resource Model by entering:
EcPIRpSlayAll <MODE> <application_id>
 - a. The **Message Handler** GUI disappears.
- 5 To obtain a list of active processes in the specified mode enter:
ps -ef | grep <MODE>
 - a. A list of active processes in the specified mode is displayed.
 - b. If an error message is received when **ps -ef | grep <MODE>** is entered, enter:
ps -auxwww | grep <MODE>

- 6 Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.
 - a. None of the following processes should be active:
 1. EcPIRpRe
 2. EcPIRpSi
 3. EcPIRpTl
 4. EcPIMsh
 5. EcPlSns
 6. EcPIRpRm
- 7 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, terminate the active process(es) by entering:


```
kill -15 process_id1 [process_id2] [process_id3] [...]
```
- 8 Repeat Steps 5 through 7 as necessary.

Table 12.3-11. Shut Down the Resource Scheduler - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Execute File → Exit to quit the Resource Scheduler GUI	single-click
2	Select OK	single-click
3	Select the UNIX window	single-click
4	Enter EcPIRpSlayAll <MODE> <application_id>	enter text, press Enter
5	Enter ps -ef grep <MODE>	enter text, press Enter
6	Verify that the resource scheduling processes have actually been shut down	observe
7	Enter kill -15 process_id1 [process_id2] [process_id3] [...] to terminate active process(es)	enter text, press Enter

12.4 Tuning System Parameters

The values assigned to system parameters affect the functioning and performance of the system. When certain parameters are modified, the system operates differently. Changes to some other parameters may not appear to affect the system although there may in fact be subtle effects. In any case before modifying system parameters it is essential to understand what will happen to system functioning and performance.

Many system parameters may be subject to control by Configuration Management (CM). When making or requesting a change to system parameters, the CM process at the particular site must be followed (if applicable).

Values are assigned to Data Processing Subsystem and Planning Subsystem parameters in the following places:

- a. PDPS database.
- b. Configuration files.

In general the system parameters in the database are modified using the GUIs. The system parameters specified in configuration files are modified by editing the appropriate configuration file.

A significant change in the management of system parameters is scheduled for the second delivery of Release 5B. The ECS configuration parameters specified in configuration files will be maintained in a *Configuration Registry*. The Configuration Registry Server will provide a single interface for retrieving configuration attribute-value pairs for ECS servers from the Configuration Registry Database, via a Sybase server. The Configuration Registry Database will be loaded with data from the configuration files. After the Configuration Registry is loaded the configuration files will be moved or renamed, making them inaccessible to the applicable servers. Consequently, when ECS servers are started they will access the Configuration Registry Database to obtain needed configuration parameters.

The Database Administrator will have access to a Configuration Registry GUI for viewing and editing configuration data in the database. Therefore, it will be necessary to coordinate with the Database Administrator when changes to configuration parameters are needed. Also, as previously mentioned, changes to configuration-controlled parameters are subject to approval through the site CM process.

The following parameters are specified in configuration files and are the parameters whose assigned values are most likely to be modified to enhance system functioning or performance:

- a. AppLogSize
 - 1. Maximum size of the application log (ALOG) file for the application in whose configuration file the parameter is specified.
- b. AppLogLevel
 - 1. Level of detail provided in the ALOG file for the application in whose configuration file the parameter is specified. A setting of “0” provides the most data.
- c. DebugLevel
 - 1. Level of detail provided in the debug log file for the application in whose configuration file the parameter is specified. A setting of “3” provides the most data.
- d. DpPr_MAX_RETRIES
 - 1. Number of retries to the Science Data Server for acquires/inserts before giving up.
- e. DpPr_WAIT_PERIOD
 - 1. Time (in seconds) to wait between retries to the Science Data Server.
- f. ListenThreads
 - 1. Number of listen threads assigned to the application in whose configuration file the parameter is specified.
- g. DpPrRM_MAX_RETRIES

1. Number of retries when creating a Data Manager object (trying to allocate).
- h. DpPrRM_RETRY_PERIOD
 1. Amount of time (in seconds) between retries when creating a Data Manager object (trying to allocate).
- i. DpPrAutoSysMaxJobs
 1. Maximum number of jobs in AutoSys at one time. Dividing the value assigned to DpPrAutoSysMaxJobs by eight produces the number of PGEs that can be in AutoSys at one time.
 2. Changing the value assigned to DpPrAutoSysMaxJobs affects the number of jobs (for the applicable mode) allowed in AutoSys at a time. The DpPrAutoSysMaxJobs parameter and number of CPUs assigned to the mode should be adjusted as necessary to ensure that all CPUs can be used but AutoSys is not overloaded with jobs waiting to be processed.
 3. Refer to Section 12.4.2 for further information.
- j. MaxSlippagePerc
 1. Percentage by which a granule can slip and still be considered a match.
- k. AcceptableCertainty
 1. Minimum overlap a granule must have.
- l. DBConnections
 1. Number of connections needed by the application in whose configuration file the parameter is specified. Subscription Manager maintains only **one** connection to the database.
- m. SleepDelayForFailures
 1. Amount of time (in seconds) to wait before reprocessing failed notifications. If the specified value is less than 60, a default value of 60 seconds would be assumed.
- n. SleepDelayForTimers
 1. Amount of time (in seconds) the Subscription Manager should sleep between checking for expired timers. It should be set to the minimum amount of time a timer will be set for at this DAAC. The minimum it can be set to is 60 seconds.

Table 12.4-1 contains a list of configuration file parameters involved in system tuning as well as some potential adjusted values.

Table 12.4-1. Data Processing Subsystem and Planning Subsystem Configuration Parameters (1 of 3)

File(s)	Parameter	Default Value	Adjusted Value or Range
Note: Default and adjusted values vary from site to site. The values listed in the table are provided as examples only. Refer to the appropriate 920-TDx-013 Custom Code Configuration Parameters document. The documents are available at URL http://cmdm.east.hitc.com/baseline/ under "Technical Documents."			
EcDpPrDM.CFG EcDpPrDeletion.CFG EcDpPrDeletionClient.CFG EcDpPrEM.CFG EcDpPrGE.CFG EcDpPrJobMgmt.CFG EcDpPrJobMgmtClient.CFG EcDpPrViewJobStates.CFG EcDpPrQaMonitorGUI.CFG	AppLogSize	= 200000	= 200000
EcPIPREditor.CFG EcPIProdStrat.CFG EcPIRm.CFG EcPIRpRe.CFG EcPIRpRm.CFG EcPIRpSi.CFG EcPIRpTI.CFG EcPISubsEdit.CFG EcPITI.CFG EcPIWb.CFG	AppLogSize	= 100000	= 200000
EcPISubMgr.CFG	AppLogSize	= 1000000	= 2000000

Table 12.4-1. Data Processing Subsystem and Planning Subsystem Configuration Parameters (2 of 3)

File(s)	Parameter	Default Value	Adjusted Value or Range
EcDpPrDM.CFG EcDpPrDeletion.CFG EcDpPrDeletionClient.CFG EcDpPrEM.CFG EcDpPrGE.CFG EcDpPrJobMgmt.CFG EcDpPrJobMgmtClient.CFG EcDpPrViewJobStates.CFG EcDpPrQaMonitorGUI.CFG EcPIPREditor.CFG EcPIProdStrat.CFG EcPIRm.CFG EcPIRpRe.CFG EcPIRpRm.CFG EcPIRpSi.CFG EcPIRpTI.CFG EcPISubMgr.CFG EcPISubsEdit.CFG EcPITI.CFG	AppLogLevel	= 0	0 – 2 A setting of 0 provides the most data.
EcPIWb.CFG	AppLogLevel	= 0	0 – 2 A setting of 0 provides the most data.
EcDpPrDM.CFG EcDpPrDeletion.CFG EcDpPrDeletionClient.CFG EcDpPrEM.CFG EcDpPrGE.CFG EcDpPrJobMgmt.CFG EcDpPrJobMgmtClient.CFG EcDpPrViewJobStates.CFG EcDpPrQaMonitorGUI.CFG EcPIPREditor.CFG EcPIProdStrat.CFG EcPIRm.CFG EcPIRpRe.CFG EcPIRpRm.CFG EcPIRpSi.CFG EcPIRpTI.CFG EcPITI.CFG EcPIWb.CFG	DebugLevel	= 2	0 – 3 A setting of 3 provides the most data.
EcPISubsEdit.CFG EcPISubMgr.CFG	DebugLevel	= 3	0 – 3 A setting of 3 provides the most data.

Table 12.4-1. Data Processing Subsystem and Planning Subsystem Configuration Parameters (3 of 3)

File(s)	Parameter	Default Value	Adjusted Value or Range
EcDpPrDeletion.CFG	DpPr_MAX_RETRIES	= 30	= 30 (number of retries)
EcDpPrDeletion.CFG	DpPr_WAIT_PERIOD	= 120	= 120 (time in seconds)
EcDpPrDeletion.CFG EcDpPrJobMgmt.CFG EcPISubMgr.CFG	ListenThreads	= 7	= 7 (number of threads) If not set, the Distributed Computing Environment (DCE) default is 10; the maximum allowed is 30.
EcDpPrEM.CFG	DpPrRM_MAX_RETRIES	= 100	= 100 (number of retries)
EcDpPrEM.CFG	DpPrRM_RETRY_PERIOD	= 120	= 120 (time in seconds)
EcDpPrJobMgmt.CFG	DpPrAutoSysMaxJobs	= 3200	(number of jobs in AutoSys at one time) Refer to Section 12.4.2.
EcPIPREditor.CFG EcPISubMgr.CFG	MaxSlippagePerc		= 0.50 (percentage)
EcPIPREditor.CFG EcPISubMgr.CFG	AcceptableCertainty		= 0.20 (percentage)
EcPISubMgr.CFG	DBConnections	= 10	= 10 (number of connections) Server maintains only one connection to the database.
EcPISubMgr.CFG	SleepDelayForFailures		=< 60 (time in seconds)
EcPISubMgr.CFG	SleepDelayForTimers	= 60	=< 60 (time in seconds)

Each procedure outlined has an **Activity Checklist** table that provides an overview of the task to be completed. The outline of the **Activity Checklist** is as follows:

Column one - **Order** shows the order in which tasks could be accomplished.

Column two - **Role** lists the Role/Manager/Operator responsible for performing the task.

Column three - **Task** provides a brief explanation of the task.

Column four - **Section** provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found.

Column five - **Complete?** is used as a checklist to keep track of which task steps have been completed.

Table 12.4-2, below, provides an Activity Checklist table of System Tuning activities.

Table 12.4-2. Tuning System Parameters - Activity Checklist

Order	Role	Task	Section	Complete?
1	Resource Planner/ Production Planner/ Production Monitor	Monitor the Load on Processing Resources	(P) 12.4.1	
2	Resource Planner/ Production Planner/ Production Monitor	Throttle the Processing Load by Modifying the Maximum Number of Jobs in AutoSys	(P) 12.4.2	
3	Resource Planner/ Production Planner/ Production Monitor	Modify System Parameters in Configuration Files	(P) 12.4.3	

12.4.1 Monitor the Load on Processing Resources

The Production Planner and Production Monitor should work with the Resource Planner to make optimum use of processing resources. The Resource Planner allocates the disk partitions, CPUs, and RAM available for processing among the active modes (e.g., OPS, TS1, TS2). The Production Planner and Production Monitor monitor the load on the processing resources.

The Resource Planner assigns the bulk (typically 60% - 80%) of the processing resources to the OPS mode. The remainder of the processing assets are divided among the modes used for SSI&T and new version software checkout.

The Production Planner and Production Monitor monitor the load on the processing resources to identify whether the actual load is appropriately distributed among modes. They either inform the Resource Planner of under- or over-use of resources as allocated or have the DpPrAutoSysMaxJobs parameter in the EcDpPrJobMgmt.CFG file adjusted.

When monitoring the load on the processing resources, the Production Planner and Production Monitor should take the following considerations into account:

- a. Disk space allocated to OPS mode is likely to be used to capacity.
- b. Disk space assigned to the other two modes may not fill up.
- c. There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- d. The operating system (OS) takes care of true CPU and RAM allocation.
 1. Actual CPU usage during processing is limited by the OS.
 2. If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.

3. What is really being defined is the maximum number of DPRs that will execute at a given time.
- e. CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
- f. If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
- g. If the science processor is at full capacity when OPS mode is at full processing capacity (and the processor may be overworked) the number of CPUs allocated to OPS mode should be reduced.
- h. Random-access memory (RAM) is subject to the same considerations as CPUs.
 1. RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.

12.4.2 Throttle the Processing Load by Modifying the Maximum Number of Jobs in AutoSys

Another consideration is the throttling of the processing load through the `DpPrAutoSysMaxJobs` parameter. `DpPrAutoSysMaxJobs` is defined in the `EcDpPrJobMgmt.CFG` file in the `/usr/ecs/MODE/CUSTOM/cfg` directory on the Queuing Server (e.g., `g0sps06`).

- a. If `DpPrAutoSysMaxJobs` in OPS mode were set at 64 [allowing AutoSys to accommodate eight DPRs (consisting of eight jobs each) simultaneously in OPS mode] and ten CPUs were defined for OPS, it would not be possible to utilize all ten CPUs.
- b. If the value of `DpPrAutoSysMaxJobs` were increased to 120 (15 DPRs times 8 jobs/DPR), there might be times when the processing of some DPRs would be held up because only ten could be running the Execute job at a time.
 1. In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously.

The maximum number of jobs in AutoSys is modified by changing the value assigned to the `DpPrAutoSysMaxJobs` parameter in the `EcDpPrJobMgmt.CFG` file using the procedure in Section 12.4.3.

12.4.3 Modify System Parameters in Configuration Files

As previously mentioned the effects on system functioning and performance must be considered before modifying system parameters. In addition, when making or requesting a change to system parameters, the CM process at the particular site must be followed (if applicable). Depending on circumstances (e.g., operator permissions) at a particular site, it may be necessary to request that the Operations Controller or System Administrator modify parameters in the configuration files. The procedure that follows is provided to assist Resource Planners who have to modify the files themselves.

Table 12.4-3 presents (in a condensed format) the steps required to modify system parameters in configuration files. If you are already familiar with the procedures, you may prefer to use the quick-step table. If you are new to the system, or have not performed this task recently, you should use the detailed procedures that follow.

- 1 At the UNIX command line prompt enter:
setenv DISPLAY <clientname>:0.0
 - a. Use either the X terminal/workstation IP address or the machine-name for the clientname.
 - b. When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.
- 2 In the terminal window, at the command line prompt, start the log-in to the Planning/Management Workstation, Queuing Server, or PDPS DBMS Server as applicable by entering:
/tools/bin/ssh <hostname>
 - a. In general Planning Subsystem applications are installed on the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02) and Data Processing Subsystem (PRONG) applications are installed on the Queuing Server (e.g., e0sps04, g0sps06, l0sps03, or n0sps08). Note the following exceptions:
 1. QA Monitor is on the Planning/Management Workstation.
 2. Subscription Manager is on the PDPS DBMS Server (e.g., e0pls02, g0pls02, l0pls01, or n0pls01).
 - b. If you receive the message, “Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?” enter **yes** (“y” alone will not work).
 - c. If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears; continue with Step 3.
 - d. If you have not previously set up a secure shell passphrase, go to Step 4.
- 3 If a prompt to **Enter passphrase for RSA key '<user@localhost>'** appears, enter:
<Passphrase>
 - a. Go to Step 5.
- 4 At the **<user@remotehost>'s password:** prompt enter:
<Password>
- 5 In the terminal window, at the command line, enter:
cd /usr/ecs/<MODE>/CUSTOM/cfg
 - a. **<MODE>** is current mode of operation.
 1. TS1 - Science Software Integration and Test (SSI&T)
 2. TS2 - New Version Checkout
 3. OPS - Normal Operations
 - b. “cfg” is the directory containing the subsystem configuration files.
- 6 To open the configuration file enter:
vi <filename>
 - a. The configuration file is displayed by the vi text editor.

- 7 Using vi editor commands find **<parameter> = <value>**.
 - a. **<parameter>** refers to the parameter with the value to be modified.
 - b. **<value>** refers to the actual value to be changed.
 - c. The following vi editor commands are useful:
 1. **h** (move cursor left).
 2. **j** (move cursor down).
 3. **k** (move cursor up).
 4. **l** (move cursor right).
 5. **i** (insert text).
 6. **x** (delete a character).
 7. **u** (undo previous change).
 8. **Esc** (switch to command mode).
- 8 Using vi editor commands replace the existing value with the desired value.
 - a. The value may already have been changed to some value other than the default value.
- 9 Press the **Esc** key.
- 10 To save the configuration file enter:
ZZ
 - a. New parameter value is entered and saved in the configuration file.
 - b. UNIX prompt is displayed.

NOTE: When the value assigned to a parameter in a configuration file has been changed and saved, the modified value does not take effect until the affected server has been restarted. For example, consider the case in which the debug level for the Subscription Manager log has been changed from “2” to “3” in the Subscription Manager configuration file. The modification does not affect the recording of data in the log until after a warm restart of the Subscription Manager (at which time the server would read the configuration file).

Table 12.4-3. Modify System Parameters in Configuration Files - Quick-Step Procedures

Step	What to Enter or Select	Action to Take
1	Log in to the ECS System using secure shell	Enter text, press Enter
2	Enter cd /usr/ecs/<MODE>/CUSTOM/cfg	Enter text, press Enter
3	Enter vi <filename>	Enter text, press Enter
4	Use vi editor commands to find <parameter> = <value>	enter text
5	Use vi editor commands to replace the existing value with the desired value	enter text
6	Press Esc	enter text
7	Enter ZZ	enter text, press Enter

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